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8-31-90

K & D ENVIRONMENTAL SERVICES, INC.

6470 BEVERLY PLAZA
ROMULUS, MICHIGAN 48174
(313) 729-3350

August 31, 1990

Mr. Ralph H. Dollhopf
U.S. E.P.A.
Eastern Response Unit
9311 Groh Road
Grosse Ile, Michigan 48138

re: Wayne County project in Farmington Hills

Dear Sir,

In response to your request for a work and safety plan, I am pleased to inform you that I am mailing copies of our standard procedures.

However, I would like to provide you with a brief summary of our work procedures.

Our first priority is to neutralize any leaking batteries, or areas where the leaking acid has contaminated, with soda ash. We will then place all of the batteries and any acid contaminated materials into plastic over-pack drums. This procedure will be conducted utilizing level "B" protection. We will also be continuously monitoring the air quality while we ventilate using large fans. When we have completed this task we will then place the acid contaminated materials from our roll-off box into over-packs and include them with the battery group.

The next step will be to place the lidless drums into over-pack drums and segregate the drums into groups of comparable materials. This procedure will also be conducted with level "B" protection unless the air quality has improved. We will then sample all of the drums. When sampling is completed we will place all of the drums into over-pack drums and identify all of the drums with corrosive labels. The samples will then be compiled and the compiled samples will be submitted for analysis.

The next order of business will be to gather all of the small containers that are scattered throughout the building and segregate them into comparable groups. We will then take samples of these materials, prior to placing them into over-packs. compile the samples and submit the compiled samples for analytical. The drums will then be appropriately labeled.

The final step, according to the guidelines that you established at the site on 8/29/90, will be to take samples from some bags that were located on the second floor, place the bags into an over-pack, and submit sample for analysis as these bags may contain asbestos.

K & D will then assist Wayne County in choosing proper disposal facilities and methods for these materials. Once disposal approvals are in place, K & D will begin transporting the materials for disposal.

Of course, if we encounter any other hazards or contaminates at this site we will report them to Wayne County and suggest appropriate action.

If you have any further questions or require additional information, please do not hesitate to call.

Respectfully,

Ken Markey

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STANDARD OPERATING PROCEDURES

for

ENVIRONMENTAL & INDUSTRIAL

PROJECT MANAGEMENT

AND

EQUIPMENT OPERATION

PREFACE

This STANDARD OPERATING PROCEDURES FOR ENVIRONMENTAL & INDUSTRIAL PROJECT MANAGEMENT AND EQUIPMENT OPERATION MANUAL is intended to provide corporate guidelines and policy for the K & D group of companies relative to carrying out day-to-day operations. This document is to be used in concert with the HEALTH AND SAFETY MANUAL, SAMPLING, ANALYSIS AND CHAIN OF CUSTODY MANUAL and the PERSONNEL MANUAL. Cross references among these various documents is intentional and essential.

SHORT FORM ACTIVITY SPECIFIC PROCEDURES or Field Operating Procedures (FOP) are provided as appendices to this STANDARD PROCEDURES FOR ENVIRONMENTAL & INDUSTRIAL PROJECT MANAGEMENT AND EQUIPMENT OPERATION MANUAL and copies are to be carried, with field personnel to all projects. Updates and/or new procedures will be added as a matter of practice to make this, and all manuals, dynamic rather than static documents.

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1.00 INTRODUCTION AND PURPOSE.

This STANDARD OPERATING PROCEDURES FOR ENVIRONMENTAL & INDUSTRIAL PROJECT MANAGEMENT AND EQUIPMENT OPERATION has been prepared for use by personnel of K & D Industrial Services, Inc. and its subsidiaries (K & D), as well as serving as a reference guideline for K & D subcontractors. All personnel engaged in environmental, remedial action or industrial service projects are required to become familiar with this manual and comply with its content, at a minimum. The manual is not meant to be exhaustive and will be updated and expanded on a regular basis as technology, procedures, practices and regulation change.

The purpose of this manual is to inform K & D personnel of the currently known and suspected hazards associated with equipment operation or with work on specific projects and provide the procedures to reduce the potential for injury or environmental degradation. Personnel are required to become familiar with and follow the provisions of this manual, as well as, applicable federal, state and local laws, including those set forth by the Occupational Safety and Health Administration (OSHA), particularly 29 CFR 1910.120, and the National Institute for Occupational Safety and Health (NIOSH).

2.00 HAZARD EVALUATION.

General categories of hazards associated with activities described herein are: physical, chemical and natural as described below. Please note that should suspected biological hazards (e.g., syringes, carcasses, sewage waste sludge) be encountered, the respective operation should cease and the Safety Officer (SO), Field Supervisor (FS), Project Manager (PM) contacted immediately for guidance prior to continuing the activity.

2.10 Physical.

The type of physical hazards that may be encountered during the activities described herein are: lifting, lacerations, contusions, electrical, noise, fire/explosion, falling objects, and those associated with heavy equipment. The health and safety (H/S) procedures to reduce the potential for injury associated with these hazards are presented in Section 4.00, where applicable.

2.20 Chemical.

The types of chemicals which may be encountered during the activities described herein may include the following: polychlorinated biphenyls; volatile/semi-volatile organic compounds; heavy metals; gasoline; fuel oil; asbestos; paints; corrosives; expoxy resins; and polynuclear aromatic hydrocarbons. For the purpose of this manual, it is conservatively assumed that these chemicals may be present in all environmental media (air, ground/surface water and soils). The H/S procedures to reduce the potential for injury associated with these hazards are presented in Section 4.00. Additionally, selected fact sheets for chemicals which may be encountered during specific projects are presented in short form summaries. The information provided includes

symptoms of exposure, acute/late biological effects, spill response, permissible exposure limits, etc.

2.30 Natural.

Natural hazards, such as, weather, poisonous plants, animals and insects cannot always be avoided. Based on available information and current site conditions, the SO, FS, PM and field personnel shall use their best judgment in mitigating these potential hazards. Additionally, Section 11.00 details work/rest regimes to be used based on ambient temperature.

3.00 SITE CONTROL.

The primary purpose of site control is to minimize the chemical and physicals hazards to site workers, visitors and the public. General site control is the responsibility of Project Managers or Field Supervisors. K & D personnel may establish additional activity-specific work zones as presented in the Health & Safety Manual and summarized in the Short Form FOP.

4.00 SAFETY AND OPERATING PROCEDURES.

4.10 Safety and Orientation Meetings:

The SO/PM/FS, or designated alternate shall conduct a safety orientation prior to initiation of each field activity as described herein. Additional safety meetings will be held during each activity as deemed appropriate by the SO, PM or FS. These meetings shall inform field personnel of individual responsibilities, potential hazards, changes in the level of personal protection, emergency response procedures, and a description of the respective activity.

4.20 Field and Equipment Operating Procedures - General.

Field work consists of the following general categories of activity:

(1) Lock-Out and Tag Procedures
(2) Confined Space Reconnaissance
(3) Sample Collection and Handling
(4) Test Borings/Monitoring Well Installations
(5) Test Pits
(6) Monitoring at Underground Tank Removal Operations
(7) Transformer Management
(8) Sewer Jet Operation
(9) Water Blaster Operation
(10) Vacuum Pumper Operation
(11) Vactor Operation
(12) Roll-off Unit Operation
(13) Cyanide Wastes Handling
(14) Corrosive Wastes (Acids/Caustics) Handling
(15) Hydrogen Sulfide Waste Handling
(16) PCB Waste Handling

(17) Excavation and Materials Handling
(18) Truck Cleanout/Wash Procedures

For all field activities described herein, the "buddy system" shall be employed unless otherwise specified. That is, work must be done with a minimum of two individuals in visual contact at all times, even if one of these individuals is a representative of the client. Air quality monitoring actions levels for activities cited herein are presented in Section 5.00. The activity-specific H/S procedures and precautions are presented in the following sections. Table 4.2 summarizes levels of protection.

4.21 Lock-Out and Tag Procedures (FOP - 4.21).

The purpose of this procedure is to assure that employees are safeguarded from unintended machine motion or unintended release of emergency when they set up, adjust, repair, service, install, or perform changeovers on equipment or machinery. This procedure applies to all employees or subcontractor employees performing any of the aforementioned tasks on K & D premises.

4.21.1 General.

Before working on or in any equipment where motion of that equipment could cause injury, the power source shall be locked in the "OFF" position and tagged with a "DANGER" red tag.

Power sources may be electrical, hydraulic, air or motor driven vehicles. Residual energy stored in hydraulic, compressed air systems or spring loaded devices must be considered and made safe before work is started.

K & D personnel will shut down and lock-out and tag the equipment using a standard tag. Additional employees assigned to work on the equipment will attach additional padlocks and tags.

Before starting any job requiring lock-out, K & D Personnel will review the procedures to be followed for lock-out and tagging requirements.

4.21.2 Procedures.

(1) Equipment/Trucks. Before working on or under a piece of equipment, a standardized tag must be attached to the ignition key of that equipment. The tag should include the name of the person working on the equipment, the date, and reason the equipment is being serviced. Tags will be available in the service department office and dispatch of each branch office.

(2) Electrical. Before working on or tying in any electrical circuit, that circuit must be broken and the

breaker box padlocked and tagged with a "DANGER" red tag. Color coded padlocks are available in dispatch. All equipment must be checked for interlocking with other circuits.

(3) Pneumatic. Before working on the air compressor or before any modification is performed in the system, the breaker will be locked in the "OFF" position with a padlock and tagged with a "DANGER" red tag.

(4) Loaded Vehicles. Any tank truck, van trailer, roll-off box, stake truck, vactor, or any other vehicle brought back to K & D premises containing hazardous and/or non-hazardous materials or waste, will be tagged as truck loaded, do not transport.

Tags are available at the service or dispatch office and can be affixed to the steering wheel and the keys of the vehicle. It is imperative that dispatch is aware of the tag out.

4.21.3 Completion of Work.

Upon completion of the work, each employee will remove his lock, rendering the machine operable when the last lock and/or tag is removed. Employees shall request assistance from their supervisor if they do not known where or how to lock-out equipment or to put equipment back into service.

4.22 Confined Space Reconnaissance (FOP - 4.22).

This activity consists of entry into buildings, tanks, manholes or other structures constituting a confined space in terms of either the structure's limited accessibility for entry/exit and/or unfavorable natural ventilation. This activity is for reconnaissance purposes only.

4.22.1 Personal Protection.

The following personal H/S equipment is required for all personnel who enter the structure (Level B) unless otherwise directed by the SO:

(1) Hard hat
(2) Outer rubber boots
(3) Inner work boots
(4) Outer protective disposable, hooded, Saranex coveralls
(5) Inner latex gloves
(6) Outer nitrile gloves
(7) Safety goggles
(8) Face shield
(9) SCBA or supplied air system

4.22.2 Monitoring.

Prior to initiating this activity, a general survey of the area will be made as the field crew approaches the structure, using the following instruments: photoionization detector (HNu P101, 10.2 eV lamp or equivalent); a MSA model 4A or equivalent combustible gas/oxygen meter; and a GM survey meter equipped with a pancake type probe. If measurements are acceptable pursuant to the guidelines presented in Section 5.00, subsequent tasks may be done at Level D-modified or Level C. If measurements are not acceptable pursuant to Section 5.00, exit the area and contact the SO for guidance.

(1) Prior to personnel entry into any confined space structure, K & D shall obtain written certification that said structure is secure and safe to enter. Additionally, K & D personnel shall inspect the builds at its perimeter for signs of instability. Should there be any evidence of structural compromise (e.g., major cracking of the foundation and/or support walls; poor beam condition; roof or floor degradation, etc.) then no entry shall be made.

(2) View building contents through windows and openings from the structure's perimeter.

(3) Where possible, monitor the following parameters through access points (e.g., windows, doors, holes, cleanouts, etc.) using extension probes on the respective instruments: combustible gas/oxygen, organic vapor, ionizing radiation, carbon monoxide and hydrogen sulfide. Level B entry may then be initiated pursuant to the following action levels:

Parameter	Value	Action
Organic Vapor	<100 ppm	Entry permitted.
	>100 ppm <500 ppm	Entry permitted. However, upon entry, benzene, vinyl chloride, methylene chloride and perchloroethylene must be assessed using colorimetric indicator tubes.
	>500 ppm	No entry. Contract SO or designee for guidance.
Combustible Gas	0-25%	Entry permitted with extreme caution.
	>25%	No entry. Contact SO or designee for guidance.
Oxygen	Any 0.1% change from ambient value	Entry permitted. However, upon entry, benzene vinyl chloride, methylene chloride and perchloroethylene must be assessed using colorimetric indicator tubes.
	<20.0 or >21.6%	No entry. Contact SO or designee for guidance.
Ionozing Radiation	>3 x background	Entry permitted with extreme caution.
	>2mRem/hr	No entry. Contact SO or designee for guidance.
Hydrogen Sulfide	>75 ppm	No entry. Contact SO or designee for guidance.
pH	<6.0 or >8.0	No entry. Contact SO or designee for guidance.
Carbon Monoxide	>125 ppm	No entry. Contact SO or designee for guidance.

4.22.3 Level B Entry.

The Level B entry team shall consist of three (3) personnel of which one (1) must be the SO or alternate. Additionally, a minimum of one (1) individual in radio contact with the entry team will be located immediately outside the structure.

The purpose of the initial entry is for reconnaissance only. The sequence of actions for this task are as follows:

(1) Verify radio contact prior to entry.

(2) Upon entry, continuous monitoring using a PID, combustible gas/oxygen meter, H_2S monitor, Geiger counter, pH paper, carbon monoxide meter, and colormetric tubes [if required based on the action levels cited in Section 4.22.2(a)]. Should action levels be attained, immediately exit the structure in an orderly fashion.

(3) Tour the structure noting and mapping prominent features such as: structural integrity; presence, condition and markings on containers/tanks/transformers; sumps; suspect materials such as asbestos, surface staining, etc.

(4) Entry team shall always be in direct visual contact.

(5) Every five minutes make radio contact with support personnel.

(6) Exit building and decontaminate pursuant to the following section.

4.22.4 Decontamination and Disposal.

At a minimum, new Saranex suits will be donned daily prior to the commence of this activity and following each work break, if soiled. Used Saranex will be placed in plastic bags and staged at a location to be designated by the SO or alternate for subsequent disposal. Work gloves and boots will be cleaned or disposed, if necessary, at the end of the work day and at work breaks. Disposed boots and gloves will be placed in plastic bags for staging at a location designated by the SO/alternate.

4.23 Sample Collection and Handling (FOP - 4.23).

Tasks within this activity consist of sampling from drums tanks, transformers, sumps, surface waters and soils or sediments. These activities shall not be initiated until completion of the reconnaissance activity as described in Section 4.22, if to be performed in confined space situations. Following reconnaissance; organize findings; reevaluate personal level of protection, instrumentation requirements, etc.; and develop a detailed approach to include specific individual duties prior to sampling. Additionally, contact the SO, PM, FS or designee prior to actual initiation of reentry, if confined space.

Please note that if transformers are encountered, those containing fluid require sampling. Transformers, suspected or known to contain PCBs require sampling. Drums/tanks that are clearly marked with appropriate labels as to their contents do not require

sampling. However, if there is any doubt as to the contents, the container should be sampled. Specific sampling techniques, equipment, procedures and QA/QC are contained in the K & D document entitled SAMPLING, ANALYSIS & CHAIN OF CUSTODY.

4.23.1 Work Zone.

Since there exists a potential for release of contaminants during these activities, a work zone will be established at each location. This area will consist of placing plastic (nominal 4 ml thickness) next to each location for staging of equipment and supplies. Additionally, a fire extinguisher (Type ABC Size II) will be at the work location.

4.23.2 Personal Protection.

The following personal H/S equipment is required for all personnel who engage in this activity (Level C):

(1) Hard hat
(2) Outer rubber boots
(3) Inner work boots
(4) Outer protective disposable, hooded, Saranex coveralls
(5) Inner latex gloves
(6) Outer nitrile gloves
(7) Face shield respirator and appropriate cartridge

4.23.3 Monitoring.

During this activity the following air quality parameters will be evaluated within the workers' breathing zone and at the point of sampling (e.g., top of drum/bung or tank opening): organic vapor, combustible gas/oxygen, carbon monoxide, hydrogen sulfide, ionizing radiation and pH. The frequency of measurements will be at least every 15 minutes or greater at the discretion of the SO/alternate based on prior air quality values and/or visual observations. The air quality actions levels and responses are presented in Section 4.22.2.

4.23.4 Decontamination and Disposal.

Sampling equipment/tools will be cleaned using the sequence of soapy water, distilled water, hexane, methanol, air drying and sealed in plastic prior to use. Following sampling, the materials will be washed with soapy water, wiped clean and placed in plastic for transport to the K & D or subcontractor facility for final decontamination.

At a minimum, new Saranex suits will be donned daily prior to the commencement of this activity and following each work break, if soiled. Used Saranex will be placed in plastic bags and staged at a location to be designated by the SO or alternate for subsequent disposal. Work gloves and boots

will be cleaned or disposed, if necessary, at the end of the work day and at work breaks. Disposed boots and gloves will be placed in plastic bags for staging at a location designated by the SO, PM, FS or alternate.

4.24 Test Borings/Monitoring Well Installations (FOP-4.24).

Activities within this category consist of test borings/monitoring well installations using a drill rig.

4.24.1 Work Zone.

Since there exists a potential for release of contaminants during this activity, a work zone will be established at each location. Wherever practical, a designated 25 to 50-foot radius around the rig will delineate the work zone. Only essential workers will be allowed within the work zone. All personnel in the work zone must wear the appropriate protective clothing and equipment. First aid kit, towels, fire extinguisher and plastic bags are also required at the drilling location.

4.24.2 Personal Protection.

Borings and monitoring well installations will be initiated in Level D-Modified personal protection. However, based on air quality monitoring and/or visual observations, the level of protection may be changed by the SO or alternate pursuant to the guidelines cited in Section 5.00.

The following personal H/S equipment is required for all personnel within the work zone (Level D-Modified).

(1) Hard Hat
(2) Outer Rubber Boots
(3) Inner Work Boots
(4) Outer Protective, Disposable Saranex Suits
(5) Inner Surgical Gloves*
(6) Outer Work Gloves
(7) Safety Glasses
(*Optional)

4.24.3 Monitoring.

Prior to initiating these activities, a general survey of the area will be made using the following instruments: photoionization detector (HNu P101, 10.2 eV lamp or equivalent); a MSA model 4A or equivalent combustible gas/ oxygen meter; and a GM survey meter equipped with a pancake type probe. If measurements are acceptable pursuant to the guidelines presented in Section 5.00, activities may then be initiated.

During these activities, monitoring of air quality within the workers' breathing zone and at the top of the borehole using

a photoionization detector (HNu P101 or equivalent equipped with a 10.2 eV lamp) and a MSA model 4A or equivalent combustible gas/oxygen meter. The frequency of measurements will be at least every 15 minutes or greater at the discretion of the SO/alternate based on prior air quality values and/or visual observations.

4.24.4 Disposal and Decontamination.

Solid subsurface or surficial materials derived from these activities (e.g. auger spoil, split spoon sample remnants, etc.) may be staged, non-sequestered, in the work zone provided that air quality measurements and/or visual observations do not indicate the presence of contaminated materials. However, should the material be suspect, then isolation of the material using plastic (nominal 4 ml above and below the material) will be required until the appropriate testing has confirmed its status. Drill or wash water will be allowed to infiltrate at the work location provided that air quality measurements and/or visual observation do not indicate the presence of suspect material. However, should drill/wash water quality be suspect, these operations will cease and the SO/alternate will assess the situation and determine the appropriate course of action.

All equipment/tools, including the drill rig will be steam cleaned or power washed prior to and upon completion of the boring/monitoring well installation.

At a minimum, new Saranex suits will be donned daily prior to the commencement of these activities and following each work break, if soiled. Used Saranex will be placed in a plastic bag and staged at a location to be designated by the SO or alternate.

Work gloves and boots will be cleaned, changed or disposed, if necessary, at the end of the work day and at work breaks. Disposable boots and gloves will be placed in a plastic bag for staging at a location to be designated by the SO or alternate.

No clothing or other protective equipment will be allowed off site until appropriately cleaned and inspected by the SO or alternate.

4.25 Test Pits (FOP-4.25).

This activity consists of using a backhoe or similar heavy equipment for the purpose of excavating contaminated materials, collecting environmental samples and observing subsurface stratigraphy and/or material type encountered. Entry into the excavation is prohibited. Refer to FOP - 4.37 for non-testing excavation procedures.

4.25.1 Work Zone.

Since there exists a potential for release of contaminants during this activity, a work zone will be established at each location. Wherever practical, a designated 50-foot radius around the backhoe will delineate the work zone. Only essential workers will be allowed within the work zone. All personnel in the work zone must wear the appropriate protective clothing and equipment. First aid kit, towels, fire extinguisher and plastic bags are also required at the test pit location.

4.25.2 Personal Protection.

The following personal H/S equipment is required for all personnel within the work zone (Level D-Modified).

(1) Hard Hat
(2) Outer Rubber Boots
(3) Inner Work Boots
(4) Outer Protective, Disposable Polylaminated Tyvek Suits
(5) Inner Surgical Gloves
(6) Outer Work Gloves
(7) Safety Glasses

4.25.3 Monitoring.

Prior to initiating these activities, a general survey of the area will be made using the following instruments: photoionization detector (HNu P101, 10.2 eV lamp or equivalent); a MSA model 4A or equivalent combustible gas/oxygen meter; and a GM survey meter equipped with a pancake type probe. If measurements are acceptable pursuant to the guidelines presented in Section 5.00, activities may then be initiated.

During these activities, monitoring of air quality within the workers' breathing zone and at the top of the excavation using a photoionization detector (HNu P101 or equivalent equipped with a 10.2 eV lamp) and a MSA model 4A or equivalent combustible gas/oxygen meter. The frequency of measurements will be at least every 15 minutes or greater at the discretion of the SO/alternate based on prior air quality values and/or visual observations.

4.25.4 Disposal and Decontamination.

Excavated subsurface materials derived from the test pit will be direct loaded into transport vehicles or will have been removed from the site. Only clean material will be used to backfill or returned to the excavation.

The sampler and related equipment including the backhoe will be cleaned after each test pit has been completed where

incompatible materials may be encountered and prior to leaving the site.

New tyveks will be donned daily prior to the commencement of this activity. Used tyveks will be placed in a plastic bag and staged at a location to be designated by the SO, PM, FS or alternate.

Work gloves and rubber boots will be cleaned, changed or disposed, if necessary, at the end of the work day and at work breaks. Disposed boots and gloves will be placed in a plastic bag and staged as noted above.

No clothing or other protective equipment will be allowed off site until appropriately cleaned and inspected by the SO or alternate.

4.26 Monitoring at Underground Tank Removal Operations (FOP-4.26)

Basic safety considerations include: limiting exposure of tank contents to personnel, control of ignition sources, use of proper excavation techniques, and control of flammable atmospheres in the tank. See also 4.37 - Excavation and Materials Handling.

4.26.1 Work Zone.

Since there exists a potential for release of contaminants during this activity, a work zone will be established at each location. Wherever practical, a designated 50 foot radius around the backhoe will delineate the work zone. Only essential workers will be allowed within the work zone. All personnel in the work zone must wear the appropriate protective clothing and equipment. A portable eyewash unit that meets ANSI standards, first aid kit, towels, fire extinguisher and plastic bags are also required at the tank location.

4.26.2 Personal Protection.

The following personal H/S equipment is required for all personnel within the work zone (Level D-Modified). Level C or Level B may substituted by the SO upon evaluation of tank contents.

(1) Hard Hat
(2) Outer Rubber Boots
(3) Inner Work Boots
(4) Outer Protective, Disposable Polylaminated Tyvek Suits
(5) Inner Surgical Gloves
(6) Outer Work Gloves
(7) Safety Glasses

4.26.3 Monitoring.

Prior to initiating this activity, a general survey of the areas will be made using the following instruments: photoionization detector (HNu P101, 10.2 eV lamp or equivalent); a MSA model 4A or equivalent combustible gas/oxygen meter; and a GM survey meter equipped with a pancake type probe. If measurements are acceptable pursuant to the guidelines presented in Section 5.00, activities may then be initiated.

During these activities, monitoring of air quality within the workers' breathing zone and at the top of the excavation using a photoionization detector (HNu P101 or equivalent equipped with a 10.2 eV lamp) and a MSA model 4A or equivalent combustible gas/oxygen meter. The frequency of measurements will be at least every 15 minutes or greater at the discretion of the SO/alternate based on prior air quality value and/or visual observations.

Additional minimal sequential operational monitoring requirements are as follows:

(1) Visual inspection of the tank location;
(2) Contacting of local utility companies or Miss Dig;
(3) Location of the tank piping, vents and manways;
(4) Verification of tank contents, volume and presence/absence of water;
(5) Sampling tank vapor space with a combustible gas/oxygen meter;
(6) Exclusion zone demarcation;
(7) Safe work surfaces; positioning of personal/equipment, staging areas;
(8) Slope or shore;
(9) Personal protective equipment;
(10) Removal of free product (pumping, if possible);
(11) Inert tank;
(12) Removal of lines (no "hot" work);
(13) Removal and cleaning of tank/lines; and
(14) Safety certification.

4.26.4 Disposal and Decontamination.

Excavated subsurface materials derived from this activity will be sequestered at the ground surface using plastic or direct loaded to transport vehicles. Following completion of the tank removal, all suspect or uncharacterized material will remain segregated for subsequent evaluation and disposal. Only clean material will be used to backfill or be returned to the excavation.

The sampler and related equipment, including the backhoe, will be steam cleaned prior to and after each removal.

New tyveks will be donned daily prior to the commencement of an excavation and following each work break, if damaged. Used tyveks will be placed in a plastic bag and staged at a location to be designated by the SO or alternate.

Work gloves and rubber boots will be cleaned, changed or disposed, if necessary, at the end of the work day and at work breaks. Disposed boots and gloves will be placed in a plastic bag and staged as noted above.

No clothing or other protective equipment will be allowed off site until appropriately cleaned and inspected by the SO or alternate.

4.27 Fork Lift Truck Operation (FOP-4.27).

4.28 Sewer Jet Operation (FOP-4.28).

4.29 Water Blaster Operation (FOP-4.29).

4.30 Vacuum Pumper Operation (FOP-4.30).

4.31 Vactor Operation (FOP-4.31).

4.32 Roll-off Unit Operation (FOP-4.32).

4.33 Cyanide Wastes Handling (FOP-4.33).

4.34 Corrosive Wastes (Acids/Caustics) Handling (FOP-4.34).

4.35 Hydrogen Sulfide Waste Handling (FOP-4.35).

4.36 PCB Waste Handling (FOP-4.36).

4.37 Excavation and Materials Handling (FOP-4.37).

4.37.1 Purpose.

To provide operating procedures for field personnel during excavation activities associated with removal of subsurface structures and materials. Also to establish procedures for terminating excavations within suspected contaminated material and materials handling.

4.37.2 Equipment and Materials.

Photoionization detector (i.e. H-Nu PI 101) Explosimeter/ Oxygen meter (LEL/O_2), Flame Ionization Geiger meter. Appropriate sampling tools, containers, etc.

4.37.3 Procedures.

(1) Monitoring: It is anticipated that on-site personnel from the owners consultant will monitor subsurface materials as they are excavated and identify:

(a) Materials other than general construction debris of a color or consistency not consistent with the natural soils or man-made fills observed in the area;
(b) Man-made containers, vessels, tanks or barrels;
(c) Electrical devices;
(d) Insulation or fibrous material that may contain asbestos; and
(e) Material that emits a chemical or petroleum odor.

Based on these observations, suspicious material will be segregated, monitored with portable field equipment and representative samples collected for further laboratory analysis and characterization. In the event the owner does not engage the services of a consultant to monitor field activities, K & D shall engage an independent consultant or follow monitoring, sampling and other procedures set forth in this manual and/or this section.

Potentially hazardous materials should be screened in the field for the presence of VOCs using a photoionization detector (PID). Samples with elevated vapor readings will be subsequently screened with a flame ionization detector (FID). Select samples will also be screened with the FID using the gas chromatograph (GC) mode to tentatively identify suspect compounds. It is assumed that the presence of volatile organic compounds should provide a general indicator of the presence of other potentially hazardous chemicals.

Chemicals screening action levels have been developed for use during excavation to categorize materials for further chemical analysis as shown in Section 5.0. The action levels guidelines are as follows:

(a) Materials that produce PID readings that exceed 2 parts per million (ppm) above background; and/or
(b) Materials that produce GC strip chart recordings that exceed the practical quantization limit for the identified compound, or the compound-specific action level established for this project, as appropriate.

Materials to be subjected to further laboratory analysis should be selected based on the results of the field screening described above and observations made by the person monitoring the excavation. Laboratory analysis

will be consistent with the current, specific parcel history, general observations made during the excavation process, and the chemical screening results. The recommended analyses will be consistent with the chemical parameters specified in any Environmental Impact Statement (EIS), and the requirements for disposal of the material. Sample collection and handling will be consistent with the project standard operating procedures, Section 4.23.

Analysis of waste samples will be performed by laboratories that participate in the U.S. EPA Contract Laboratory Program (CLP), in accordance with the Environmental Scope Document. Analytical procedures should conform to CLP or SW-846 protocol, as appropriate.

(2) Excavation Limits: When suspect materials are encountered, the excavation should continue both laterally and vertically until field monitoring indicates that all suspect material has been removed. The monitoring should consist of both visual observation and screening with portable field instruments as described above in Section 4.37.3(A). The excavated area will be located on appropriate site maps and logged in daily field notebooks. Additional field explorations should be performed within excavated areas only when laboratory analyses indicates that excavated materials were contaminated and could pose a threat to human health or the environment. Additional field explorations should not be required if contaminants were not identified by laboratory analyses.

(3) Excavated Materials Handling: All suspect excavated material segregated during the excavation process should be staged at a pre-designated, secure location on the parcel. The segregated materials should be placed on plastic liners and covered with plastic. Each suspect material pile should be clearly identified for subsequent identification and disposal. Once laboratory analysis of samples are received, a determination of the disposal requirements should be established and appropriate disposal manifest completed. Such activity may have been accomplished prior to K & D receiving authorization to proceed, in which case direct loading to transport vehicles may proceed.

4.37.4 Records and Documentation.

All field monitoring data should be identified in field notebooks and daily activity reports as noted in the QA/QC documentation for the project. All sample collection and handling should follow established standard operating procedures and/or procedures identified in U.S. EPA SW-846. A

final report including location, depth, field and laboratory analyses and ultimate material disposition should be prepared for project documentation.

4.37.5 Special Notes.

The intent of this FOP is to provide a mechanism where, once suspected contaminated materials are encountered, they are removed to their full extent. Final determination of remedial action and/or confirmatory testing/explorations may be made jointly with the MDNR and EPA.

4.37.6 Applicable Standards and/or References.

U.S. EPA, 1986 "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, Third Edition, November 1986.

4.38 Truck Cleanout/Wash Procedures (FOP-4.38).

4.39 Transformer Management (FOP-4.39).

4.39.1 Transformer Identification.

Prior to initiating any onsite project involving an electrical transformer, including, but not limited to, retrofitting, dismantling, removal or repair, the following information shall be secured and noted on a project log or record:

(1) Date of Installation;
(2) Serial Number;
(3) Manufacturer;
(4) Size; and
(5) Volume of Liquid Content.

In addition to securing the above information, the transformer shall be inspected for plates or other information which identifies the current or past contents of fluids, such as but not limited to the words PCB, Askarel, Arochld, Chlorextol, Inerteen, Pyranol, Asbestol, Diachlor, Elemex, Hyvol, etc. If found, the transformer and I.D. plates shall be hi-lited with paint or other permanent markings, to confirm the presence of PCB oils or fluids. In the event of no markings and the existence of oils, or oil residue, sampling shall be undertaken in accordance with Section 4.39.3.

4.39.2 Work Zone.

Since there exists a potential for release of contaminants during this activity, a work zone will be established at each transformer location. Wherever practical, a designated 10-foot radius around the transformer will delineate the work zone. Only essential workers will be allowed within the work

zone. All personnel in the work zone must wear the appropriate protective clothing and equipment. First aid kit, towels, fire extinguisher and plastic bags are also required at the site.

4.39.3 Oil Sampling & Testing.

Whenever there is no independent analytical documentation as to the fluid content of a transformer or its characteristics or whenever such test data is over one year old, analytical sampling and testing shall be performed in accordance with the K&D Sampling, Analysis & Chain of Custody Manual and EPA SW-846, Method 8080. Independent analytical data shall be prepared for each individual transformer. Each respective transformer and analytical result shall be cross-referenced and permanently noted on a one-to-one basis.

4.39.4 Personal Protection.

The following H/S equipment is required for all personnel within the work zone (Level D-Modified).

(1) Hard Hat;
(2) Outer Rubber Boots;
(3) Inner Work Boots;
(4) Outer Protective, Disposable Polylaminated Tyvek Suits;
(5) Inner Surgical Gloves;
(6) Outer Work Gloves; and
(7) Safety Glasses.

4.39.5 Monitoring.

Prior to initiating these activities, a general survey of the area will be made using the following instruments: photoionization detector (HNU P101, 10.2 ev lamp or equivalent); a MSA model 4A or equivalent combustible gas/oxygen meter; and a GM survey meter equipped with a pancake type probe. If measurements are acceptable pursuant to the guidelines presented in Section 5.00, activities may then be initiated.

4.39.6 Transportation and Disposal.

Prior to any offsite movement of transformers, or transformer fluids, a final check shall be made in the presence of the owner, or owner's representative, to confirm a match between analytical work and individual transformers. Subsequent transportation may then proceed in accordance with TSCA, RCRA and any state or local regulations.

5.00 AIR MONITORING ACTION LEVELS.

The following air monitoring action levels and responses are to be implicitly used for all activities cited herein.

Parameter	Reading	Personal Level Of Protection	Remarks
Total Organic Vapor	<1	D	D-modified. See specific tasks within Section 4.00.
	≥1		Continuous reading for five minutes. Shut down operations, exit work zone and contact SO/alternate, who will assess situation and decide on appropriate course of action.
Oxygen Concentration (%)	≥0.1 % change in ambient oxygen concentrations		Shut down operations, exit work zone and contact SO/alternate, who will assess situation and decide on appropriate course of action.
Explosivity (% LEL)	0-10		Proceed if total organic vapor and/or O_2 reading acceptable.
	10-25		Proceed with extreme caution if total organic vapor and/or O_2 readings are acceptable.
	>25%	--	Shut down operations, exit work zone and contact SO/alternate, who will assess situation and decide on appropriate course of action.
Ionizing Radiation (mRem/hr)	>3x background value		Shut down operations, exit work zone and contact SO/alternate, who will assess situation and decide on appropriate course of action.

NOTES: ppm = parts of contaminant vapor per million parts of air.

% = percent

% LEL = Percent of the lower explosive limit (LEL) for pentane air (manufacturer's specification). At a certain critical proportional mixture of combustible gas or vapor in air, combustion or

explosion will occur in the presence of a spark or flame. This critical mix is defined as the LEL.

Background = Readings taken at site perimeter.

6.00 SAFETY, HYGIENE AND FIRST AID.

All personnel engaged in any environmental or service activity herein shall, at a minimum, wash hands and face prior to eating or drinking at work breaks in the area designated by the SO, PM, FS or alternate. Bathing at the end of the work day is strongly encouraged.

Smoking, eating, drinking, and wearing of contact lenses within the work zones are prohibited.

7.00 ACTIVITY-SPECIFIC SHORT FORM OPERATING PROCEDURES.

For ready field reference, Activity-Specific Operating Procedures and Health/Safety Plans (Short Form) for the activities cited herein are presented in Appendix A.

8.00 MEDICAL MONITORING.

All personnel entering work zones shall either be participants in a medical monitoring program which meets or exceeds the requirements set forth in 29 CFR 1910.120, or an entry/exit physical examination will be required. All personnel must provide written documentation from their employer that this specification is so satisfied.

Please note that the SO/alternate may deem it necessary for on-site personnel to undergo additional medical examinations in the event of a known/suspected exposure during a particular field activity.

9.00 TRAINING.

All personnel entering work zones where known or suspected hazardous materials are present shall satisfy the requirements of OSHA's regulation for Hazardous Waste Operations and Emergency Response (29 CFR 1910 and 1926) and any other applicable federal, state and local laws/guidelines. At its option, K & D may train personnel involved in field operations which do not involve hazardous materials.

All non-K & D personnel must provide written documentation from their employer that they have satisfied the training requirements.

10.0 EMERGENCY RESPONSE.

A list of emergency phone numbers and local hospitals shall be carried by all K & D FS's, PM's or SO's and shall also be posted at each Branch or field office in form similar to Table 10.1.

10.10 Emergency Phone Numbers (Table 10.1).

Hospitals:

Fire:

Police:

Ambulance:

Supervisor Phones/Pagers:

10.20 Emergency Procedures.

The FS, PM or SO/alternate shall be responsible for instituting appropriate emergency procedures in response to an event. An emergency situation will be announced by three blasts from a freon air horn. Personnel will shut down, secure their operation, and immediately assemble at the most readily available location and await further instruction from the SO/alternate.

10.20.1 Inhalation Exposure.

(1) If symptoms are present (dizziness, nausea, headache, shortness of breath, burning sensation in mouth, throat, or lung), the victim should be escorted from the work zone air space immediately.

(2) If unconscious, the victim should be removed from the work zone immediately. Rescuers should, if practical, be wearing proper respiratory and protective equipment before attempting the rescue.

(3) If the victim is no longer breathing, mouth-to-mouth resuscitation (CPR) or some other form of artificial respiration should begin immediately and medical support personnel notified.

10.20.2 Skin Exposure.

The skin should be washed with copious amounts of soap and water. If clothing is contaminated, it should be removed immediately and the skin washed thoroughly with running water. All contaminated parts of the body, including the hair, should be thoroughly decontaminated. It may be necessary to wash repeatedly.

10.20.3 Ingestion.

Medical support should be obtained immediately.

10.20.4 Eyes.

If a toxicant should get into the eyes, flush with generous amounts of water. Washing should be continued for at least 15

minutes and medical attention obtained, if deemed necessary by the PM, FS or SO/alternate.

10.20.5 Personal Injury.

The injured person should be moved (if appropriate) outside the work zone. The PM, FS or SO/alternate must be notified immediately to evaluate the nature of the injury, and the affected person should be decontaminated to the extent practical.

First aid should be administered and arrangements made to transport the injured person, if necessary, to the designated medical facility. Site personnel shall not re-enter the work zone until the cause of the injury or symptoms is determined, and it is designated safe to re-enter by the PM, FS or SO/alternate.

10.20.6 Fire/Explosion.

Upon notification of a fire or explosion on site, the designated emergency signal (three blasts) will be sounded. All site personnel will assemble at the designated access points. The fire department will be alerted and all personnel will move to a safe distance from the involved area. Personnel should NOT attempt to fight fires on site except with approved equipment and under the direction of the K & D PM, FS or SO.

11.00 WORK/REST REGIMES.

The PM, FS or SO/alternate shall monitor ambient temperature and implement the following work/rest regimes accordingly.

11.10 Heat/Cold Stress Monitoring.

For ambient temperatures between -15° and 70°F, standard rest breaks (e.g. 15 minutes every 4 hours) should be used. For temperatures below -15°F work will be done at the discretion of the PM, FS or SO/alternate. For temperatures above 70°F, the following regime shall be followed.:

Temperature	Work	Rest	Comments
70° to 75°F	2 hours	15 min.	Review heat stress in a safety meeting. Schedule a beverage break every two hours, at a minimum.
75° to 80°F	2 hours	15 min.	Seated rest. Drink at least eight ounces at each break.
80° to 85°F	90 min.	15 min.	As above. Rest area to be shaded.
85° to 90°F	60 min.	15 min.	As above. Try to provide a shaded work area.
90°F	30 min.	15 min.	As above. Try to reschedule work to avoid mid-day heat.

12.00 PROJECT COORDINATION & MANAGEMENT.

The purpose of this Section is to identify an organizational format and procedures to properly document and manage remedial, industrial service and environmental projects of K & D. The forms and organization structure are generalizations and may be slightly modified at each Branch Office in keeping with K & D goals of maintaining Branch Office independence within corporate guidelines.

12.10 Adherence to Applicable Laws.

K & D is mandated to adhere to all federal, state and local laws, regulations and rules which apply to the field and administrative activities of the Company. It is the responsibility of K & D management to monitor and inform all personnel, through implementation of the organizational chart chain of command process, of applicable laws, rules and regulations. To the extent possible and practical, K & D will inform its customers of environmental and other regulations which impact the K & D/customer relationship. In no instance will K & D knowingly act or tolerate the acts of others which are not in conformance with the highest standards of conduct.

12.20 Documentation.

Documentation of procedures and commitments is an essential administrative activity at K & D. The sections which follow establish minimum standards for uniform conduct of administrative activities.

12.20.1 Proposals.

Prior to initiating any work, a written proposal shall be prepared and presented to the client for approval and signature. The proposal shall contain, at a minimum, the scope of work to be provided, pricing and any non-standard terms or conditions which

apply to the project or job. Standard terms and conditions may be found on the K & D Proposal Form (see Figure 12.20.1). Proposals may take many forms, including bid documents prepared by the customer.

12.20.2 Project Descriptions.

A Project Description shall be filled out as a work order release by the Branch Coordinator and/or Field Supervisor and given to Crew Leaders at the start of a job. The Project Description (see Figure 12.20.2) shall contain reference to a specific proposal, contract, purchase order, or blanket order number. Project Descriptions shall not serve as a proposal.

12.20.3 Authorization to Proceed.

The authorization to proceed is the next step in beginning a project. The authorization to proceed can take many forms (i.e., work order release, formal letter, etc.), but is essential in the overall process which results in full payment. No emergency work is to be initiated without a written authorization to perform work, tied to cost estimates or, at a minimum, standard pricing schedules.

12.20.4 Scope of Work Change Orders.

In the event that there is a significant change in the scope of work originally proposed and approved which is likely to result in either (a) a cost increase, (b) a completion schedule modification, or (c) a standard or criteria of project completion, then a Change Order (see Figure 12.20.4) is required to be signed by the customer.

12.20.5 Forms.

In addition to the above mentioned forms, the standard forms which follow this page may be required as part of a project activity. The are to be utilized at the discretion of the PM, FS or SO.

12.30 Standard Organization.

In order to define chain of command in decision making, K & D has established an organizational chart and position descriptions for key personnel likely to be involved in remedial, industrial service or environmental projects. K & D relies on the "Team Approach" relative to project activity and management, thus input from all levels of management and operation is encouraged.

12.30.1 Corporate and Branch.

(1) Corporate - Figure 12.30.1(a)

(2) Branch - Figure 12.30.1(b)

12.30.2 Branch Manager Description.

(1) Manages field and office operations and gives guidance to Field Supervisor relative to schedules of work to be performed by field and office personnel.

(2) Plans and prepares the annual budget. Submits budget for administrative approval. Implements and monitors approved budget and compiles Branch statistics and data.

(3) Determines major equipment needs for operations and recommends items to be purchased.

(4) Hires field and administrative personnel in accordance with Corporate guidelines and assures new personnel are properly trained and/or prepared to perform assigned functions.

(5) Coordinates and prepares special studies, reports and proposals.

(6) Ensures that Branch operations, comply with applicable State and Federal statutes and regulations, coordinating with other Branches and under guidelines established by the Vice President of Environmental Technical Services.

(7) Provides administrative oversight and assures Branch compliance with safety requirements.

(8) Assists in the preparation of proposals and contracts.

(9) Resolves Branch problems and issues, interfaces with clients and governmental agencies to answer inquiries and resolve complaints.

(10) Performs other duties as required.

12.30.3 Field Supervisor/Project Manager Description.

(1) Supervises the work of field personnel. Schedules and prioritizes the work performed, assigning crews to specific tasks.

(2) Inspects work in progress and completed work. Assesses work quality and assures that employees perform in accordance with corporate quality standards and labor agreements.

(3) Maintains and reviews the field records and prepares daily and monthly work reports, as requested.

(4) Assures that adequate amounts of materials, equipment and supplies are available to meet the needs of ongoing and scheduled projects.

(5) Schedules and regulates outside contractor(s) activities, as required.

(6) Assists clients and contractors by answering inquiries and resolving problems related to the activities of the Company.

(7) Oversees the maintenance and repair of vehicles and equipment while in the field.

(8) Enforces and maintains corporate safety standards. Instructs employees in work and safety procedures as well as technical procedures related to specific tasks.

(9) Responsible for job-site and project inventory control and disbursement.

(10) Represents the Company meetings with developers and contractors, as required.

(11) Performs other duties as required.

12.30.4 Safety Officer:

(1) Learn and insure our compliance with regulations affecting K & D.

(2) Record and keep records regarding compliance with those applicable regulations.

(3) Keep track of safety meeting topics and required permits and training of our employees, including forklift permits, SCBA training, respirator training, etc. Will develop and instruct an individual employees training record.

(4) Must be familiar with the following:

(a) P.A. 64 & administration rules (hazardous)
(b) P.A. 136 (liquids)
(c) P.A. 60 (PCB act)
(d) R.C.R.A.
(e) CFR 40 - Transportation
(f) CFR 49 - Hazardous Waste
(g) CFR 29 - Labor

(5) Assist in preparation of all required regulatory reports and environmental.

(6) Prepare, implement and monitor site and project specific Health and Safety (H/S) plans in accordance with the guidelines established in the HEALTH AND SAFETY MANUAL.

13.00 WASTE EVALUATION & MANAGEMENT.

13.10 Duties & Responsibilities.

13.10.1 Generator.

13.10.2 K & D.

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14.00 DISCIPLINARY ACTION.

SAMPLING, ANALYSIS & CHAIN OF CUSTODY MANUAL

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1.00 OVERVIEW.

1.10 Introduction.

The objective of this SAMPLING, ANALYSIS AND CHAIN-OF-CUSTODY MANUAL is to establish procedures and guidelines to characterize potentially contaminated materials at a site, prior to undertaking removal actions.

Samples will be collected to determine:

(1) compatible waste streams;

(2) define surficial contaminant boundaries;

(3) determine contaminant receptors; and

(4) select the most acceptable treatment or disposal mode of all waste materials.

The resultant database may be used by waste receiving facilities (TSD) in order to assess the possibility of accepting the contaminated materials for treatment and/or disposal.

2.00 SAMPLE COLLECTION.

2.10 Tank Sampling.

Sampling will be carried out to delineate the different phases of liquid present in each tank, the volume of each phase (if different phases are present) and to characterize the tank liquids for contaminate content and compatibility for disposal/treatment.

2.10.1 Tank Sampling Procedure.

Tanks will be sampled according to the following procedures. The accessibility of any tank will determine how the tank will be sampled. In general, the following procedures will be followed to obtain a representative sample from a tank:

(1) An oil phase interchange probe and/or tape covered with "water-cut" sensing material will be lowered into the tank to determine the number of phases and depth of each phase of liquid contained in the tank;

(2) A Bacon bomb, Kemmerer, or similar sampling device will be lowered on a nylon rope into the tank;

(3) A discrete sample will be collected from each phase interval of contained liquid, wherever possible, and placed in a pre-labeled sample container. If the phase interval is not adequate in volume to sample, a composite sample of the various phases will be collected and homogenized;

(4) The sample container will be securely capped and transported to a laboratory;

(5) Sampling logs will be kept to document from which tank the sample was collected, the depth interval sampled, the approximate volume of contained liquid, the approximate volume of contained sludge material, any stratification of material, physical description of each sample, sampler's name, and date and time of collection;

(6) The sampling device will be decontaminated prior to each use according to procedures specified in Section 2.10.3;

(7) Nylon rope will be changed between each tank sampled;

(8) Disposable latex gloves used as outer gloves during sampling will be changed between each sample; and

(9) All disposable sampling and safety equipment will be collected, consolidated with other bulk solid wastes and disposed of as contaminated bulk solids.

2.10.2 QA/QC Sampling Procedures.

When specific QA/QC procedures are specified, duplicate and rinsate blank samples will be collected at a frequency of one for every 20 samples collected. Duplicate samples will be obtained by simultaneously filling two sample bottles from the sample volume collected using the appropriate sampling procedure. The duplicate samples will be treated as separate samples for labeling and analytical purposes and will be logged as such in the field log book.

Rinsate blanks will be collected from the rinse fluids produced from the final step in the decontamination sequence detailed in Section 2.1.3. Rinse fluids will be collected directly in the sample container.

2.10.3 Sampling Equipment Decontamination Procedures.

All sampling equipment which may come in contact with potentially contaminated materials shall be decontaminated prior to field use and after each sample is collected. Composite samples will be collected and homogenized, therefore, sampling equipment will not be decontaminated between collection of each aliquot of the same composite. Decontamination of equipment will be performed as follows:

(1) Clean water wash and scrub to remove all visible foreign matter;

(2) Rinse with distilled water;

(3) Rinse with reagent grade isopropanol;

(4) Rinse with reagent grade hexane;

(5) Rinse with reagent grade isopropanol;

(6) Air dry on a clean plastic sheet; and

(7) Final distilled water rinse.

Fluids used for decontamination will not be recycled. All decontamination fluids will be collected, sampled and disposed of at the completion of the remedial work activities.

2.10.4 Tank Inventory.

In order to determine accurate information regarding the state of the tanks at a site, an inventory of tanks will be conducted.

This activity will include, where practical, the verification of tank dimensions, the geometry and location of each tank on site, and the condition of each tank.

2.20 Drum Sampling.

2.20.1 Drum Entry Procedure.

Extreme care will be exercised in opening drums or other sealed containers in which the contents may be harmful to sampling personnel. When practical, a drum will not be moved or opened unless the drum appears to be structurally sound.

After the initial opening and visual inspection of drum contents, drums will be identified into two classes, solid or liquid.

During the initial inspection, any customized containers, suspicious looking drums, or drums labeled as containing extremely hazardous materials (explosives, etc.) will be clearly marked for special handling.

All drum markings will be recorded on a drum log data sheet. Photo documentation will be performed as needed.

All drums will be entered with a hydraulically operated non-sparking penetrating device operated remotely. All openings will be plugged except during sampling operations.

2.20.2 Drum Sampling Procedures.

The following procedures will be adhered to during sampling of drummed liquid waste:

(1) Remove cover from sample container;

(2) Insert acrylic or glass tubing almost to the bottom of the drum or until a solid layer is encountered. About one foot of tubing should extend above the drum. If more than one phase of material is identified in liquid or solid drums, each phase will be sampled for compatibility testing and waste characterization as appropriate. If no phasing is apparent, then the sample will be collected from at least 12 inches down from the top of the drummed waste;

(3) Allow the waste in the drum to reach its natural level in the tube;

(4) Cap the top of the sampling tube with a double gloved thumb or stopper, ensuring liquids do not come into contact with the sampler's thumb or stopper;

(5) Carefully remove the capped tube from the drum and insert the uncapped end in the sample container. Do not spill liquid on outside of bottle;

(6) Release the thumb or stopper and allow the sampler to drain completely and fill the sample container. Repeat the above steps until sufficient volume has been collected for analysis;

(7) Remove tube from the sample container;

(8) Cap the sample container tightly and place pre-labeled sample container in a carrier;

(9) Replace the bung or place plastic over the drum;

(10) Complete drum log data sheet. (An example of the drum log data sheet is provided as Figure 2.20.2); and

(11) Transport the sample to the laboratory for analysis.

Sampling of drummed solids or sludges will conform to the preceding procedures and the following:

(1) Sample collection will be accomplished using a stainless steel or disposable spatula and spoon. All stainless steel sampling equipment will be cleaned between subsequent drums using the cleaning protocols described in Section 2.10.3. Disposable spatulas will be discarded after each use; and

(2) A representative sample will be collected from a depth at least four inches from the top of the drum contents' upper surface.

DRUM INSPECTION LOG

SITE: _____

LOCATION: _____

_____

_____

DRUM # _____ DATE: _____

PROJECT # _____ TIME: _____

TYPE OF CONTENTS: ___SOLID ___LIQUID ___SLUDGE ___LAB PAK

COLOR _____ HNU _____

pH _____ EXPLO _____

OVA _____

AMOUNT OF CONTENTS: ___FULL ___3/4 ___1/2 ___1/4 ___LESS THAN 1"

DRUM SIZE: ___55 GAL ___41 GAL ___30 GAL ___5 GAL

DRUM MARKINGS: _____

_____

_____

_____

DRUM TYPE: ___17H ___17E ___37M ___FIBER ___OVERPACK ___OTHER

DRUM CONDITION: ___DETERIORATED ___LEAKING ___DENTED ___OK/DOT

SAMPLE METHOD: ___PIPETTE ___TROWEL OTHER _____

COMMENTS: LAYER DESCRIPTION

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

FIGURE 2.20.2

2.40 Wipe Sampling.

2.40.1 General.

Wipe samples for determination of surficial contamination will be collected for analysis from various surfaces as required at specific project sites. The actual number of samples collected will be determined in the filed or according to specifications. All wipe samples collected will be from areas most likely to exhibit contamination.

2.40.2 Wipe Sample Collection.

Wipe samples will be collected using 3-inch by 3-inch soxhlet-extracted cotton gauze pads as follows:

(1) An area of 0.25 square meters, if available, will be marked using a template or an appropriate measuring device; and

(2) The wipe samples will be obtained by wiping the area with the cotton pad first in one direction and then in a second direction perpendicular to the first.

(3) The cotton gauze pads will be folded with the sample surfaces facing inwards and placed in properly labeled sample jars equipped with a teflon-lined lid and submitted for analysis.

2.50 Soil and Sediment Sample Collection.

To determine the extent of contamination of surficial soils in, and around, the area of concern, samples will be collected in an appropriate grid pattern.

In addition, sediment sampling and analysis for contamination will be carried out for sediment material located in, on or around and areas as off-site lagoons, drainage swales and other natural accumulations of surface water that are potential contaminant receptors. Sediment sampling will occur once surface waters have been removed. The actual number of sediment samples will be based on field conditions existing at the time of sample collection. However, at least one sediment sample will be collected for each surface water area suspected of contamination.

A split-spoon sampler will be used to retrieve soil and sediment samples, as outlined below:

(1) A new pair of disposable latex gloves will be used at each sample location;

(2) Prior to use at each general site location, all sampling equipment will be decontaminated and shall be cleaned in accordance with Section 2.10.3;

(3) A split-spoon sampler will be manually driven into the ground to a depth greater than the required six-inch depth for sampling;

(4) The split-spoon sampler will be retrieved and opened upon a clean sheet of polyethylene or aluminium foil;

(5) Using a clean cutting tool, the collected section below the required sample interval will be removed from the bottom of the core. The remaining core will be removed and homogenized in a clean stainless steel bowl prior to sample collection transfer to jars. Each jar sample will be removed from the homogenized material using clean stainless steel spoons or other appropriate sampling equipment. Each sample will be placed in a prelabeled 250 ml glass jar and sealed with a teflon lined cap;

(6) If necessary a second core will be collected immediately adjacent to the first to retrieve sufficient material for analyses. Where a second core is required for analyses or as a duplicate sample, the collected samples shall be composited and homogenized in a clean stainless steel bowl prior to being placed in the sample jars;

(7) Samples which are to be collected for investigative purposes and consequently do not need to be split will be collected as follows. The bottom of the collected sample will be trimmed as specified in Item 5. The remaining core will be cut in half longitudinally. A continuous vertical sample will be collected from the center of the exposed face of the core sample. The sample will be removed using clean utensils to a prelabeled glass jar; and

(8) All equipment used during sampling, which may have come in contact with potentially contaminated soils, will be decontaminated in accordance with Section 2.10.3. Latex gloves used during the collection of the sample will be disposed of in accordance with Section 3.40.1.

Where an asphaltic concrete/concrete surfacing material overlies a soil sampling location, the surfacing material will be cored through to obtain access to subsurface materials.

3.00 SAMPLE HANDLING.

3.10 Sample Handling.

Samples may contain hazardous constituents; therefore, samples shall be handled at all times with the utmost care to reduce any threat to the public, sampling personnel or the environment.

3.20 Sample Labeling.

Following sample collection each sample jar or bottle will be labeled with the following information:

(1) project name;

(2) project location;

(3) sample identification number;

(4) date; and

(5) the sampler's initials.

The label will be sealed with clear plastic tape to ensure that it will not peel off or become damaged.

3.30 Chain-of-Custody Procedures.

3.30.1 Laboratory Custody Procedures.

The laboratory of choice or specification will designate a "sample custodian" and an alternate to act in his/her absence. In addition, the laboratory will set aside as a "sample storage security area" an isolated room which should be secured and have limited access.

The custodian will receive the incoming samples and indicate receipt by signing the Sample Chain-of-Custody Record Sheet accompanying the samples and retain the sheet as a permanent record. The custodian should check to ensure that the sample numbers indicated on the Custody Form correspond with the sample jar identification numbers. All incoming samples will be entered into a laboratory sample log book.

Immediately upon receipt, the custodian will place samples in the sample room which shall be secured at all times except when samples are removed or replaced by the custodian.

The custodian will maintain the integrity of the samples by appropriate storage and must distribute samples to the personnel who are to perform tests.

The analyst shall record information in his/her laboratory notebook or analytical work sheet that describes the samples, the procedures performed, and the results of the tests. The notes must be retained as a permanent record in the laboratory and should include any abnormalities which occurred during the testing procedure.

Standard methods of laboratory analysis will be used, as described in Section 4.00, unless otherwise specified.

Laboratory personnel will be responsible for the care and custody of a sample once it is handed over to them and shall be prepared to testify that the sample was in their possession and viewed or secured in the laboratory at all times from the moment it was received from the custodian until the tests were run.

Once the sample testing is completed, the unused portion of the sample together with all identifying tags, laboratory records, and other documentation of work, will be returned to the custodian for filing in a secured file location.

3.30.2 Sample Chain-Of-Custody Record Sheet.

The Sample Chain-of-Custody Record Sheet will be introduced into the analytical chain at the time of sample collection. The Sample Chain-of-Custody Record Sheet will be completed for each sample collected and will accompany the sample until it is ultimately disposed of. Figure 3.3.2 presents an example of the Sample Chain-of-Custody Record Sheet.

The use of the custody sheet will be as follows:

(1) The Site Sampler will fill in all required information from the sample labels upon collection of samples;

(2) The original custody form will be sealed in plastic and placed within the shipping container;

(3) The shipping container will be sealed with security tape;

(4) Custody will be transferred to the analytical laboratory which will check the integrity of the security seal upon receipt and retrieve the custody form from the shipping container; and

(5) Sample disposal will be done by the laboratory. Upon disposal, the laboratory will sign the next open "Relinquished by" box, and words "Disposed" will be written in the "Received by" box.

3.40 Sample Transport.

Following collection of the sample, the lid of the sample container will be secured with electrical or duct tape and the container enclosed in a polyethylene zip-lock bag and sealed. Each sample to be transported to the analytical laboratory will be logged on the Sample Chain-of-Custody Form. Samples will be stored in a cooler and packed with appropriate packing material to cushion the samples during shipment. The cooler will be sealed with fiberglass strapping tape and security tape will be placed on the cooler prior to shipping.

3.40.1 Waste Material Handling.

All wash water, rinse water, and decontamination fluids generated during the sampling program will be collected and placed in approved containers for disposal.

All potentially contaminated articles generated during the sampling program such as used coveralls, gloves, and sampling thiefs will be secured in plastic bags or approved drums and secured on site.

4.00 SAMPLE ANALYSIS.

4.10 Overview.

Sample analysis will be conducted with the intent of characterizing waste materials for the purpose of disposal, and, in the case of surficial materials, for contaminant boundary definition. Details of analysis for each media type are presented in the following section.

4.20 Waste Characterization of Samples.

The specific sample analyses will be based on the disposal facilities requirements. However, based on prior experience, the analysis of materials will likely be performed for the analytes listed on Table 4.20 in accordance with the methods outlined in Section 4.30.2 and Table 4.20.

TABLE 4.20

POTENTIAL WASTE CHARACTERIZATION ANALYSIS

Physical Characteristics	
Physical State	Sample inspection
Free Liquids	Sample inspection
Specific Gravity	Volume and weight measurement
pH	EPA SW-846(1), Method 9040
Flash Point	EPA SW-846, Method 1010
Chemical Composition	
Metals	EPA SW-846, Method 6000/7000 series for TAL (2) metals
Organic	
TCL (3)	
Volatiles	EPA SW-846, Method 8240
Organochlorine Pesticides and PCBs	EPA SW-846, Method 8080
TCL Semi-volatiles	EPA SW-846, Method 8250/8270
Other Components	
Cyanides	EPA SW-846, Method 9010/9012
Sulfides	EPA SW-846, Method 9030
Phenolics	EPA SW-846, Method 8040
Hazardous Characteristics	
Reactivity	EPA SW-846, Section 7.3, Chapter 7
Corrosivity	EPA SW-846, Method 1110
EP Toxicity	EPA SW-846, Method 1310 (4)

Note:

(1) EPA SW-846, Test Methods for Evaluating Solid Waste, Third Edition, 1986.
(2) TAL = Target Analyte List
(3) TCL - Target Compound List
(4) Including analysis of EP Tox leachate per 40 CFR 261.

4.30 Drummed Waste Compatibility Testing.

4.30.1 Segregation of Drummed Wastes Into Waste Classes.

Drummed wastes will be segregated according to compatibility characteristics prior to consolidation. The waste classes determined by the testing referenced in this section will permit an assessment of material incompatibilities and chemical characteristics which need to be further addressed for disposal purposes. Segregated materials which are determined to have the same compatibility and physical characteristics and; thus, form a unique waste stream will be subjected to waste characterization for disposal.

The determination of compatible waste streams will be conducted at an off-site contract laboratory using samples collected in the field following the protocols referenced herein, as follows:

(1) General Testing (Field Assessment).

(a) Visual Classification - All wastes will be visually classified as to state (liquid or solid), color, viscosity and other identifying features;

(b) Phase Determination - Phase determination will be implemented to assess whether the waste is a liquid, solid, or heterogeneous mixture. This determination may sometimes be difficult for very viscous liquids or resins, but it is not crucial because the same characterization tests are performed on both solids and liquids;

(2) Compatibility Testing (Laboratory Analysis).

Samples will be collected and shipped to an off-site contract laboratory. All samples will be collected in accordance with protocols discussed in Section 2.20.2. All samples will be shipped and analyzed under Chain-of-Custody procedures, as detailed in Section 3.30.

All samples will be analyzed to determine the following parameters:

(a) phase separation;
(b) matrix type;
(c) physical description;
(d) pH;
(e) oxidizers;
(f) peroxides;
(g) water solubility;
(h) cyanide;
(i) sulfides;
(j) phenols;
(k) flammability; and
(l) chlorine content.

Following identification of individual compatible waste groups, lab scale confirmation of same will be performed with aliquots of each constituent sample within a compatible stream.

4.30.2 Waste Characterization of Drums.

Analysis of drummed materials, as required by the disposal facilities, will be performed following compatibility testing and will consist of the analysis of representative composite samples of each waste stream (compatible materials). The analysis of a composite will be performed prior to performing the actual field consolidation to ensure that consolidated materials are acceptable to the disposal facilities.

The physical and chemical testing protocols which may be required to meet the general testing requirements of various disposal facilities may include the analyses listed on Table 4.20.

Additional or fewer tests may be required to meet the specific requirements of a particular disposal facility. The waste characterization requirements will be confirmed following selection and identification of disposal facilities. Oil wastes will always be tested for PCB's unless specific documentation eliminates PCB's as a potential contaminant.

The data obtained during the testing conducted to determine the waste class will be utilized to the extent possible to determine which parameters may be of concern for disposal.

4.40 Surface Water Samples.

Extraction of surface water samples will be performed according to USEPA Method SW-846 3510 or 3540. Extract analysis protocols shall be carried out in strict accordance with the appropriate USEPA SW-846 Method.

4.50 Wipe Samples.

All wipe samples will be analyzed for PCB's according to USEPA Method SW-846 8080 when required. All other samples will utilize the appropriate SW-846 Method.

4.60 Soil/Sediment Samples.

All soil/sediment samples involving transformers will be analyzed for PCB's. Extraction of soil/sediment samples will be performed according to USEPA Method SW-846 3540 or 3550. PCB analysis will be carried out according to USEPA Method SW-846 8080, other samples will follow the appropriate SW-846 Method.

HEALTH AND SAFETY MANUAL

FOR

REMEDIAL ACTION, INDUSTRIAL SERVICES AND DECONTAMINATION ACTIVITIES

TABLE OF CONTENTS

LIST OF TABLES & ATTACHMENTS

1.0 GENERAL.

The purpose of this HEALTH AND SAFETY MANUAL is to provide guidance, direction and policy for a safe and minimal risk working environment for employees and subcontractors of K & D Industrial Services, Inc. and its subsidiaries ("K & D"). It also details emergency response procedures to minimize the potential for adverse impact of construction, industrial service and environmental activities on the general public. Further, it provides measures to mitigate the potential for migration of contaminants. Together with the K & D STANDARD OPERATING PROCEDURES FOR ENVIRONMENTAL AND INDUSTRIAL PROJECT MANAGEMENT and EQUIPMENT OPERATION, Service Work, the Health and Safety Manual when modified for site specific activities will assure minimization of potential adverse health, safety, environmental and personnel impacts.

2.0 BASIS.

The Occupational Safety and Health Administration (OSHA) Standards and Regulations contained in Title 29, Code of Federal Regulations, Parts 1910 and 1926 (29 CFR 1910 and 1926) provide the basis for this Safety and Health Manual. Provisions of this Manual are in addition to OSHA regulations and reflect the K & D position on the policy of the USEPA and the National Institute for Occupational Safety and Health (NIOSH) regarding procedures to insure safe operations at hazardous waste sites, industrial projects and environmentally sensitive locations.

The safety and health of the public, K & D personnel and our client, as well as the protection of the environment, will take precedence over cost and schedule considerations for all project work. The designated Project Manager (PM), on-site Safety Officer (SO) or Field Supervisor (FS) shall be responsible for decisions regarding when work will be stopped or started for health and safety considerations.

3.0 HEALTH AND SAFETY PERSONNEL.

A Site Safety Officer or his designated alternate (SO/alternate) who will have qualifications and experience in occupational health, shall be on-site during all major remedial or service activities involving sampling, pumping, decontamination, handling or excavation of contaminated material. The site Safety Officer reports directly to a Certified Industrial Hygienist who shall be responsible for implementing and overviewing the Health and Safety on a full-time basis.

3.1 Certified Industrial Hygienist.

The Certified Industrial Hygienist shall:

a) Be responsible for implementation of a project specific Health and Safety Plan at the start-up of potentially hazardous work;

b) Be responsible for a pre-work activity indoctrination of all on-site personnel with regard to the safety plan and other safety requirements to be observed during the project, including:

i) potential hazards;

ii) personal hygiene principles;

iii) personnel protective equipment (PPE);

iv) respiratory protection equipment usage and fit testing; and

v) emergency procedures dealing with fire and medical situations; and

c) Oversee the Site Safety Officer's activities and be available on an as-needed basis for emergency situations.

3.2 Site Safety Officer:

The Site Safety Officer shall:

a) Be responsible for daily enforcement and monitoring of the site specific Health and Safety Plan;

b) Be responsible for assisting the Certified Industrial Hygienist in the pre-work activity indoctrination of all on-site personnel;

c) Be responsible for notifying the PM or FS prior to initiation of any hazardous work;

d) Be responsible for the maintenance and separation of "Exclusion" (potentially contaminated) and "Clean" (uncontaminated) areas as described hereafter; and

e) Be responsible for maintenance of the emergency contingency plan.

4.0 MEDICAL SURVEILLANCE

Medical surveillance shall be subject to an employee's expected interval of time spent on a potentially hazardous project site, past hazardous work history and date of last medical examination. In accordance with 29 CFR 1910.120, if an employee wears a respirator on a routine basis or as part of routine activities for any party of 30 days during a year, then medical surveillance shall be provided to the minimum requirements specified by the examining physician.

K & D shall retain the services of a licensed physician or physician's group to provide the medical examinations and surveillance required. All pertinent site characterization data, a copy of 29 CFR 1910.120, and a description of the intended personnel protective equipment shall be provided to the physician prior to completing medical surveillance. The name of the physician and evidence of examination shall be maintained on file at K & D and shall be provided to the PM or FS prior to assigning personnel on-site work activities involving contact with potentially contaminated materials. K & D and subcontractor's personnel medical approvals shall also be maintained by K & D at the project Site Office for the duration of the project,

if the project is to have a continuous duration of over 30 days or if specific site conditions dictate otherwise.

Medical surveillance protocols shall be the physician's responsibility but shall, as a minimum, meet the requirements of OSHA Standard 29 CFR 1910.120 and 29 CFR 1910.1324 for all personnel. This exam may include:

i) medical/occupation questionnaire with work history;

ii) full physical examination;

iii) screening audiometric test with otoscopic exam for wax;

iv) visual acuity measurement, including color perception;

v) pulmonary function test;

vi) resting EKG;

vii) chest x-ray (only when clinically indicated by other testing procedures);

viii) blood chemistry profile[1];

ix) complete blood count with differential and platelet evaluation, including WBC, RBC, HGB, Hematocrit; and

x) urinalysis with microscopic examination.

All on-site personnel requiring full medical surveillance shall be provided with medial surveillance within a reasonable time period prior to entering the site, and at any time there is suspected to be excessive exposure to toxic chemicals or physical agents.

K & D shall maintain all medical surveillance records of its personnel for a minimum period of thirty (30) years and shall make those records available to personnel or governmental agencies as specified in 29 CFR 1910.20 and 29 CFR 1913.10.

5.0 TRAINING.

All personnel assigned to or entering hazardous or potentially hazardous sites shall complete training or refresher sessions. Training shall also be provided to all personnel not involved with hazardous materials relative to safe and proper equipment operation. Training and refresher sessions shall ensure that all personnel are capable of using, and familiar with, safety, health, respiratory and protective equipment and with the safety and security procedures required for a specific site, project or piece of

[1]Minimum Blood Chemistry Profile: Calcium, Phosphorous, Glucose, Blood Urea Nitrogen (BUN), Uric Acid, Cholesterol, Total Protein, Total Bilirubin, Direct Bilirubin, Alkaline Phosphatase, SGOT, SGPT, Sodium, Potassium, Chloride, Creatinine, Triglycerides, Albumin, Globulin, A/G Ratio, Lactic Acid Dehydrogenase (LDH) Serum Iron.

equipment. The training session shall be completed by the Safety Officer or other qualified professional.

In accordance with 29 CFR 1910.120, all employees exposed to hazardous substances, health hazards or safety hazards shall receive formal training that includes a minimum of 40 hours of instruction off site and three days of actual field experience under direct supervision. K & D shall provide documentation confirming that all assigned personnel have complied with this regulation. Each individual's name who has completed training shall be included as part of Appendix 5.0 of this Health and Safety Manual and shall be updated at least annually.

Any site-specific or project specific training program shall include, as a minimum, the following applicable items:

i) names and personnel responsible for site health and safety;

ii) site-specific potential hazards;

iii) use of PPE, including proper donning and doffing procedures;

iv) work practices by which the employee can minimize risks from these potential hazards;

v) safe use of engineering controls and on-site equipment;

vi) discussion and completion of medical surveillance requirements and recognition of symptoms associated with exposure to hazards;

vii) site access control methods;

viii) on and off-site contingency plans;

ix) decontamination procedures;

x) site-specific standard operation procedures;

xi) delineation between work zones;

xii) use of the buddy system;

xiii) review on-site communications and appropriate hand signals between personnel working in the Exclusion and/or Contaminant Reduction Zone.

The Safety Officer shall be responsible for ensuring that personnel not successfully completing the required training are not permitted to enter the site to perform work. The Contractor shall implement a hazard communication ("Right-to-Know") program in accordance with 29 CFR 1910.1200 and Section 6.0. Further, the K & D Standard Operating Procedures for Environmental and Industrial Project Management shall be reviewed and modified as required for the specific site.

6.0 HAZARD COMMUNICATION PROGRAM.

6.1 General.

The following hazard communication program has been established for K & D. This program is available for review by all employees.

6.2 Hazard Determination.

K & D Industries, Inc. will be relying on material safety data sheets from suppliers to meet determination requirements.

6.3 Labeling.

6.3.1

The maintenance supervisor will be responsible for seeing that all containers coming in are properly labeled.

6.3.2

All labels shall be checked for:

a) Identity
b) Hazard
c) Name and address of responsible party.

6.3.3

Each employee shall be responsible for seeing that all portable containers used in their work area are labeled with identity and hazard warnings.

6.4 Material Safety Data Sheets (MSDS).

6.4.1

The safety director will be responsible for compiling the master MSDS file. It will be kept at the dispatch office of the respective K & D branch.

6.4.2

Copies for MSDSs for all hazardous chemicals to which employees may be exposed will be kept in a file at the dispatch office of the respective K & D branch.

6.4.3

MSDSs will be available for review to all employees during each workshift. Copies will be available upon request to Branch Manager.

6.4.4

The Corporate Safety Director will provide the required MIOSHA Right-To-Know posters and postings notifying employees of new or revised MSDSs within five days of receipt of new or revised MSDSs.

6.5 Employee Information and Training.

6.5.1

The Corporate Safety Director shall coordinate and maintain records of training conducted for all employees.

6.5.2

Before starting work, or as soon as possible thereafter, each new employee will attend a safety class. In that class, each employee will be given information on:

a) Chemicals and their hazards in the workplace.

b) How to lessen or prevent exposure to these chemicals.

c) What the Company has done to lessen or prevent workers exposure to these chemicals.

d) Procedures to follow if they are exposed.

e) How to read and interpret labels and MSDSs.

f) Where to locate MSDSs and from whom they may obtain copies.

6.5.3

The employee will be informed that:

a) The employer is prohibited from discharging, or discriminating against, an employee who exercises the rights regarding information about hazardous chemicals in the workplace.

b) As an alternative to requesting an MSDS from the employer, the employee may obtain a copy from the Department of Public Health. A sign will be posted with the address and telephone number of the department responsible for such requests.

6.5.4

Attendance will be taken at training sessions. These records will be kept by Branch Managers or Safety Officers and the Corporate Safety Director.

6.5.5

Before any new hazardous chemical is introduced into the workplace, each employee will be given information in the same manner as during the safety class.

6.6 Hazardous Non-Routine Tasks.

6.6.1

On occasion, employees are required to do work in hazardous areas (e.g. confined spaces). Prior to starting work in such areas, each employee will be given information about the hazards involved in these areas.

The information will include:

a) Specific chemical hazards.

b) Protection/safety measures the employee can take to lessen risks.

c) Measures the Company has taken to lessen the hazards including ventilation, respirators, the presence of another employee, and emergency procedures.

6.6.2

It is the policy of K & D that no employee will begin work in a confined space, or any non-routine task, without first receiving a safety briefing.

6.7 Informing Contractors.

6.7.1

It is the responsibility of the management team/safety director to provide any other contractors with employees exposed to our chemicals with the following information:

a) Hazardous chemicals with which they may come in contact.

b) Measures the employees may take to lessen the risks.

c) Where to get MSDSs for all hazardous chemicals.

6.7.2

It is the responsibility of the customer to obtain chemical information from contractors when they will expose our employees to hazardous chemicals which they may bring into our workplace.

6.8 Pipe and Piping Systems.

Information on the hazardous contents of pipe and piping within the physical confines of a branch location shall be kept on file in dispatch and communicated with all employees.

7.0 WORK AREAS/SITE CONTROL.

Specific work areas, whether hazardous or not, shall be delineated to the greatest extent possible by fence, flagged line or other delineation as outlined below:

a) Exclusion Zone (EZ) - This zone shall include all areas where contaminated liquids, soils or other materials are to be pumped, excavated, or handled, and all areas where contaminated equipment or personnel travel.

   The EZ shall be clearly delineated in the field prior to commencing site work, by temporary fencing, caution flagging or other such warning signs spaced around the perimeter of the Zone warning of a hazardous work area;

b) Contaminant Reduction Zone (CRZ) - This zone will occur at the interface of the EZ and Clean Zone and shall provide for: the transfer of construction materials and equipment to the EZ, the decontamination of equipment which has come into contact with potentially contaminated materials prior to leaving the EZ, the removal and temporary storage of disposable PPE, the decontamination of personnel and clothing prior to entering the Clean Zone and for the physical segregation of the Clean Zone and EZ; and

c) Clean Zone (CZ) - This area is the portion of the site defined as being the area outside the zone of significant air, soil or surface water contamination. The Clean Zone shall be clearly delineated and procedures implemented to prevent active or passive migration of contamination from the work site. The function of the Clean Zone includes:

   i) An entry area for personnel, material and equipment to the Exclusion Zone;

   ii) An exit area for decontaminated personnel, materials and equipment from the Exclusion Zone;

   iii) The housing of site-special services; and

   iv) A storage area for clean safety and work equipment.

8.0 COMMUNICATIONS.

Telephone service shall be provided to the site whenever possible and will continue until completion of all activities. Emergency numbers including

police, fire, ambulance, hospital, and appropriate regulatory agencies shall be prominently posted near each phone. In the absence of telephone service, hand held, 2-way radios shall be used to communicate between the site and a fixed base facility capable of telephone communications to emergency facilities.

9.0 EMERGENCY AND FIRST AID EQUIPMENT AND SUPPLY

At a minimum, the safety equipment listed below shall be located and maintained within the Clean Zone in appropriate locations as directed by the Safety Officer.

a) Portable emergency eye wash and shower;

b) One twenty pound ABC type dry chemical fire extinguishers;

c) One hand-held emergency siren.

10.0 EMERGENCY CONTINGENCY AND RESPONSE PLAN

10.1 Emergency Spill Remediation Plan

In order to ensure a rapid response to mitigate any off-site migration due to spills or leakage on a project site containing free liquids, the following minimum equipment and materials will be staged on site or immediately available at the initiation of activities:

1) 3,000 gallon tanker or storage tank;

2) Two cases oil dry/sorbent;

3) One gasoline-powered portable pump (minimum capacity of 10 gpm);

4) 200 feet of hose with couplings compatible for use with item 3;

5) Two shovels;

6) Two cubic yards vermiculite or equivalent;

7) 4 mil polyethylene sheeting (minimum of 5 rolls);

8) One wheel-barrow; and

9) Five sorbent blankets.

In the event of spillage of contaminated material, free liquids will be transferred directly to the on-site 3,000 gallon spill retention vessel. Spilled liquids will be confined to the immediate area of the spill and the liquids will be pumped, with the use of a portable pump into the spill retention vessel. Spilled liquids will be confined by diking around the spill with native material or with an inert absorbant. Any residual liquids which cannot be pumped will be

absorbed with a sufficient quantity of inert absorbant to ensure that no free liquids remain. If the spill occurred on soil, the visibly affected soil will be treated as contaminated material based on a visual determination of spill contamination. This material will then be excavated and placed in a separate stockpile pending disposition on the basis of analytical data for the stockpile contents.

Liquids spilled within lagoons, trenches or ground depressions will be pumped, with the use of a portable pump, into the spill retention vessel. Native material or an inert absorbent will be placed adjacent to the spill area to absorb any residual liquid. Materials underlying the spill zone will be treated as contaminated materials based on a visual determination of spill contamination. This material will be excavated and placed in a separate stockpile pending disposition on the basis of analytical data for the stockpile contents.

10.2 Off-Site Contingency Plan:

Prior to commencing work involving the pumping, excavation, handling and disposal of potentially contaminated material, the PM, FS or SO will coordinate the development of an off-site emergency contingency plan. This plan will provide adequate plans for an immediate response to a serious site occurrence such as an accident, explosion, fire or migration of significant quantities of toxic or hazardous material from the site into adjacent public areas. The plan shall also identify expected routes of travel from the site to the approved disposal facility and shall provide for plans to contain and mitigate contaminants escaping into the environment as a result of an accident during transit off-site.

Coordination meetings shall be held with appropriate authorities which may include Fire Department, Hospital, State and City Police, State Department of Transportation, County Health Department and Civil Defense officials. The meetings shall identify the Emergency response coordinator through whom all information and coordination will occur in the event of an incident. Plans shall be developed, or existing plans incorporated into the master plan, for:

i) excavation of adjacent areas;

ii) fire fighting procedures;

iii) transport of injured personnel to medical facilities;

iv) priority transportation routes; and

v) coordination and/or modification of highway operations.

Techniques and recommended procedures for immediate first aid emergency response will be developed with the local medical facilities. One or more hospitals shall be proposed as emergency medical facilities for the project.

10.3 On-Site Contingency Plan.

a) In the event of injury to on-site personnel or contact with hazardous materials, the following protocol shall be followed:

i) in the event of injury, notify the Safety Officer, and the FS or PM;

ii) contact the closest medical center and describe the injury (closet medical center shall be established prior to commencing any work on-site);

iii) decontaminate personnel and administer appropriate emergency first aid; and

iv) transport personnel to the medical facility identified in 10.2;

b) Fire extinguishers shall be maintained in strategic locations within the site to combat localized fires; and

c) In the event of significant release of toxic or hazardous vapors from any container or excavation, the source of such vapors shall be immediately backfilled or covered with fill. Equipment operators shall utilizes appropriate air respirators during such operations. Alternate plans of contaminant removal will be developed prior to recommencing work in the area.

11.0 PERSONAL SAFETY AND RELATED EQUIPMENT.

All on-site personnel shall be equipped with personal safety equipment and protective clothing appropriate for the hazardous material being handled and the nature of work being completed. All safety equipment and protective clothing shall be kept clean and well-maintained.

11.1 Standard Safety Equipment.

Standard safety equipment and apparel as required for work involving various Levels of Protection within the Exclusion Zone shall be as shown in Table 11.1.

TABLE 11.1

LEVELS OF PROTECTION
(*Optional)

A. Level A Protection. Personnel Protective Equipment.

a) Pressure-demand, self-contained breathing apparatus, approved by the Mine Safety and Health Administration (MSHA) and National Institute of Occupational Safety and Health (NIOSH).

b) Fully encapsulating chemical-resistant suit.

c) Coveralls or other approved work clothing.

d) Gloves (outer), chemical-resistant.

e) Gloves (inner), chemical-resistant.

f) Boots, chemical-resistant, steel toe and shank. (Depending on suit construction, worn over or under suit boot).

g) Hard hat (under suit)

h) Disposable protective suit, gloves, and boots* (worn over fully encapsulating suit)

i) 2-way radio communications (intrinsically safe)*

B. Level B Protection. Personnel Protective Equipment

a) Pressure-demand, self-contained breathing apparatus (MSHA/NIOSH approved)

b) Chemical-resistant clothing (overalls and long-sleeved jacket; coveralls; hooded, one or two-piece chemical-splash suit; disposable chemical-resistant coveralls)

c) Coveralls or other approved work clothing

d) Gloves (outer), chemical-resistant.

e) Gloves (inner), chemical-resistant.

f) Boots (outer), chemical-resistant, steel toe and shank.

g) Boots (outer), chemical-resistant (disposable)*

h) Hard hat (face shield*)

i) 2-way radio communications (intrinsically safe)*

C. Level C Protection.

1. Personnel Protective Equipment.

a) Full or 1/2 face, air-purifying, canister or cartridge-equipped respirator (MSHA/NIOSH approved)

b) Chemical-resistant clothing (coveralls; hooded, two-piece chemical splash suit; chemical-resistant hood and apron; disposable chemical-resistant coveralls)

c) Coveralls or other approved work clothing

d) Gloves (outer), chemical-resistant

e) Gloves (inner), chemical-resistant*

f) Boots (outer), chemical-resistant, steel toe and shank*

g) Boots (outer), chemical-resistant (disposable)*

h) Hard hat (face shield*)

i) Escape mask*

j) 2-way radio communications (intrinsically safe)*

D. Level D Protection.

1. Personnel Protective Equipment

a) Coveralls

b) Gloves*

c) Boots/shoes, leather or chemical-resistant, steel toe and shank

d) Boots (outer), chemical-resistant (disposable)*

e) Safety glasses (or chemical splash goggles*)

f) Hard Hat (face shield*)

g) Escape mask*

11.2 Additional Protective Measures.

Additional protective equipment usage guidelines to be implemented at all K & D environmental or service projects include:

a) Safety glasses must be worn. All prescription eyeglasses in use must be safety lenses. Contact lenses may be permitted, depending on the nature of the materials on-site.

b) During periods of respirator usage in contaminated areas, respirator filters shall be changed daily or upon breakthrough, whichever occurs first;

c) All on-site personnel shall wear an approved Hard hat.

d) All PPE work on site shall be decontaminated at the end of each work day. The Safety Officer shall be responsible for ensuring that individuals decontaminate PPE before reuse; and

e) Duct tape or other equivalent measures shall be used to ensure that disposable coveralls and gloves are tightly secured when personnel are working within contaminated zones.

12.0 RESPIRATORY PROTECTION

Respiratory protection, as appropriate for all on-site personnel, shall be mandatory during all on-site construction activities. As a minimum, all on-site K & D or subcontractor personnel shall be required to wear air purifying respiratory protection when working in the Exclusion Zone consistent with potential airborne hazards. The selection of appropriate protection is based upon the potential presence of compounds with the lowest recommended threshold limit value.

In the absence of specific air quality information, the following levels of respiratory protection shall be used as a guideline when working in the Exclusion Zone:

Total Organic Vapor Concentration (ppm)	Level of Respiratory Protection Required
0-25	Full or 1/2 face air purifying protection
greater than 25	Supplied air system or suspend activities

All major construction equipment handling potentially contaminated materials shall be equipped with a source of compressed air for air supplied respirators, should they be required.

The Safety Officer shall be responsible for implementing, maintaining and enforcing the respirator program. On-site personnel unable to pass a respirator fit test will not be permitted to enter or work in the Exclusion Zone or Contaminant Reduction Zone.

13.0 PERSONAL HYGIENE

The Safety Officer shall be responsible for, and ensure that all personnel performing or supervising remedial work within a hazardous work area, or exposed or subject to exposure to hazardous chemical vapors, liquids, or contaminated solids, observed and adhere to the personal hygiene-related provisions of this section.

On-site K & D or subcontract personnel found to be disregarding the personal hygiene-related provisions of this plan will be barred from the site.

13.1 Personal Hygiene Facilities.

The following equipment/facilities shall be provided for the personal hygiene of all on-site K & D or subcontract personnel during operations; upon concurrence of the Site Safety Officer.

a) Suitable disposable outer-wear, gloves, and footwear on a daily or as-needed basis for the use of on-site personnel;

b) Contained storage and disposal for used disposable outer-wear;

c) Personnel hygiene facilities complete with change area, showers, or toilets, and wash basins with contained storage or approved treatment for all wash waters, when project activities are expected to be on-going for over 30 days.

d) Lunch area.

e) A smoking area may be designated by the SO; however, smoking is not endorsed or encouraged as a matter of principal by K & D.

13.2 Personnel Regulations.

The following regulations for K & D and subcontractor personnel working within the Exclusion Zoned will also be enforced:

a) Personnel shall wear appropriate disposable outer-wear and gloves at all times whenever entering or working in the Exclusion Zone or Contaminant Reduction Zone when hazardous materials are involved;

b) Used disposable outer-wear shall not be reused, and when removed, will be placed inside disposable containers provided for that purpose;

c) Smoking will be prohibited except in a designated smoking area;

d) Eating and drinking shall be prohibited except in the designated lunch or break area;

e) Soiled disposable outer-wear shall be removed prior to entering the lunch area, and prior to cleansing hands;

f) On-site personnel shall thoroughly cleanse their hands and other exposed areas before entering the smoking or lunch area; and

g) All personnel involved in excavation and/or handling of potentially contaminated materials in the Exclusion Zone or Contaminant Reduction Zone shall assure that proper decontamination occurs, including shower and change to street clothes when appropriate, prior to leaving the site.

14.0 CONTAMINANT MIGRATION AND PARTICULATE EMISSION CONTROL.

To prevent the migration of contaminated material both on site and off site, vehicle travel shall be restricted. All vehicles and equipment used in the Exclusion Zone (EZ) shall be decontaminated in the Contaminant Reduction Zone prior to leaving the site. The PM will certify that each piece of equipment has been decontaminated prior to leaving the EZ or removal from the site.

Decontamination shall involve the thorough cleaning of equipment by hand scraping or a high pressure steam cleaning unit if required, and shall be performed on a decontamination pad to be constructed on site. Decontamination wash waters shall be collected and contained in an on-site storage tank. Wash waters will be sampled prior to treatment by activated carbon, discharge to the local POTW or other approved source disposal.

Personnel engaged in vehicle decontamination shall wear protective equipment including disposable clothing and respiratory protection as directed by the SO based on specific site conditions.

During excavation, truck loading or construction, a dust control program shall be implemented and strictly enforced to minimize the generation and potential off-site migration of fugitive particulate emissions. Excavations and excavated material shall be kept moist while uncovered due to site activities. Decontamination wash waters may be used to keep excavated materials moist. All roadways, designated work areas and other possible sources of dust generation shall be controlled by application of water or other approval material as required.

15.0 CONFINED SPACE ENTRY PROCEDURES.

15.1 Purpose and Scope.

To protect the health and safety of site personnel by establishing a standard for work within confined spaces. These procedures apply to all confined space survey activities as detailed in FOP-4.22 of the

The Site Safety Officer will be responsible to ensure that precautions have been taken as outlined in these procedures to assure safe entry of confined spaces.

15.2 Procedure.

15.2.1 Permits.

Site Personnel are not to enter any confined space without a written confined space permit (see attachment 15.2.1). The confined space entering permit will be valid for a single shift only. On jobs requiring more than a single shift to bring to completion, a new permit should be completed at the start of each shift. Properly completed permits shall be readily available at the site. They will be kept on file for at least 48 hours after the completion of the shift for which they were issued.

15.2.2 Variances.

Should any circumstances be found where these rules cannot be met, rules to insure adequate safety for entering these specific confined spaces must be written out by the Safety Officer, for approval in accordance with the site specific Safety Plan. This variance should detail any special conditions and should be attached to the confined space work permit.

15.2.3 Preparation Prior to Entry.

a) Power must be de-energized, locked and tagged (see FOP - 4.21).

b) Every effort must be made to remove all hazardous contents from the confined space. Tests for flammable vapor and oxygen content must be taken on a continuous basis while anyone is in the confined space. If the tests do not meet the requirements of item 15.2.4 and FOP-4.22, the workers must leave the confined space.

15.2.4 Testing of Atmospheres Within Confined Spaces.

a) Oxygen: Oxygen content must be above 19.5 percent and below 21 percent before entry will be allowed.

b) Flammable Vapors: Site Personnel shall leave confined spaces if the concentration of explosive gases exceeds 25 percent of the lower explosive limit.

c) Toxic Substances: Organic vapors and H_2S will be monitored. Personnel shall leave the confined space, if any of the following levels are exceeded:

Organic Vapors	25 ppm
H_2S	10 ppm

15.2.5 Ingress and Egress/Life Lines.

A safe means of ingress and egress, such as a portable ladder, must be kept in place at all times when site personnel are occupying a confined space.

Means shall be provided for quick removal of individuals from confined spaces in emergencies. Where the least dimension of the access opening is less than 24 inches, wrist straps or noose-type wristlets shall be worn. Where the least dimension of the access opening is greater than 24 inches, either a life belt, safety harness, wrist straps or noose-type wristlets may be worn. In either case, a life line shall be attached and securely anchored outside the confined space.

15.2.6 Protective Clothing.

Level C protection at a minimum shall be worn by Survey Site Personnel entering confined spaces. Site specific conditions and safety plans shall be developed in accordance with the guidelines of this section.

15.2.7 Illumination.

a) Temporary lighting used in the confined space shall be of the vapor proof design with heavy duty cords and fittings and insulations maintained in good condition.

b) Portable (battery powered) lighting shall be operated at a maximum of 12 volts.

c) Portable (battery powered) lighting shall be kept at-the-ready outside of the confined space access opening to be used as illumination in the event of failure of the principle system. These lights shall be capable of providing illumination for a period of at least one hour.

15.2.8 Safety Monitors.

a) A person designated as a safety monitor shall be stationed at the access opening of any confined space while it is occupied. He/she must have continuous visual or verbal contact with occupants. One of his/her major responsibilities is to summon additional help in emergency situations.

b) In addition to the safety monitor, there shall be another person located within 100 feet and not more than one floor above or below the confined space opening. This individual may do work other than that related to the confined space entry but it should not be such as to prevent his/her responding to a call for aid.

15.2.9 Safety Monitor Equipment.

The following emergency items shall be located at the access opening of the confined space or not more than 15 feet from such opening.

a) Respiratory equipment as specified for Level B protection.

b) Life lines, as described in item 15.2.5 above.

c) A battery powered portable light, as described in item 15.2.7(c) above.

d) A portable type air-horn, capable of being heard 100 feet away over background noises.

16.0 AIR MONITORING.

During the progress of active work, air quality will be monitored in and around each active work location. Monitoring will be conducted on a daily basis and additionally as required by special or work-related conditions and directed by the SO, FS or PM.

A daily monitoring program will consist of monitoring with a HNu systems photoionization detector for volatile organic vapors, an explosimeter for combustible atmospheres and ambient oxygen concentrations. The results of the air monitoring program will be recorded in a hard cover log book, which will be maintained by the Site Safety Officer for the duration of the project.

Immediately upon identifying elevated levels of organic vapors (based on site specific materials) and/or explosive limits (greater than 20 percent of the Lower Explosive Limit), reduced oxygen concentrations (less than 19.5 percent oxygen), the air monitoring results shall be reported to the SO and/or, _____, who will determine when operations shall be shut down and restarted. Air will be monitored at the downwind side of the work zone of concern as well as the downwind site perimeter to identify any potential impact of the general public and surrounding environment.

17.0 SAFETY MEETINGS.

The Safety Officer, Project Manager or Field Supervisor will conduct daily pre-work safety meetings which will be mandatory for all site personnel. The meetings will review ongoing safety issues and protocols, and will

examine new site conditions as they are encountered. Additional safety meetings will be held on an as-required basis.

Should any unforeseen or site-peculiar safety related factor, hazard, or condition become evident during the performance of work, it will be brought to the attention of the FS or PM in writing as quickly as possible, for resolution. In the interim, prudent action shall be taken to establish and maintain safe working conditions and to safeguard employees, the public, and the environment.

18.0 POSTED REGULATIONS.

"No Smoking" signs shall be posted at the site entrance and on the perimeter of the Exclusion Zone. In addition, signs which state "Warning, Hazardous Work Area, Do Not Enter Unless Authorized" or other warnings appropriate to site specific conditions shall be posted. A notice directing visitors will be posted at the site entrance.

19.0 SITE SECURITY.

Project sites shall be secured on a 24-hour basis by K & D personnel or sub-contractors unless such security is provided by K & D clients. In addition, during remedial activities, site security will be provided on the same basis until all tanked, excavated and drummed solids or liquids are removed from the site. Security will include an unarmed security officer whose responsibility shall be:

a) Limit vehicular access to the site to authorized vehicles and personnel only;

b) Maintain a visitors and site personnel sign-in/sign-out log, and a log of all security incidents; and

c) Provide initial screening of site visitors.

20.0 REFERENCES.

1. "The Merck Index. An Encyclopedia of Chemicals and Drugs, Ninth Edition" Martha Windholz (ed.) Merck & Co. Inc. Rahway, N.J. (1976).

2. Sittig, M: "Handbook of Toxic and Hazardous Chemicals and Carcinogens, 2nd Edition". Noyes Publications, Park Ridge, N.J. (1985).

3. American Conference of Governmental Industrial Hygienists. "Threshold Limit Values and Biological Exposure Indices for 1986 - 1987".

4. U.S. Department of Health and Human Services "NIOSH Pocket Guide to Chemical Hazards", September 1985.

5. SAX, N.I.: "Dangerous Properties of Industrial Materials" Van Nostrand Reichold Company, New York (1984).

6. Title 29, Code of Federal Regulations, Parts 1910, 1913 and 1926.